Sub A1

CLAIMS:

1. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising A_xSe_y, where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

forming a silver comprising layer over the chalcogenide material;

irradiating the silver effective to break a chalcogenide bond of the chalcogenide material at an interface of the silver comprising layer and chalcogenide material and diffuse at least some of the silver into the chalcogenide material, and forming an outer surface of the chalcogenide material;

after the irradiating, exposing the chalcogenide material outer surface to an iodine comprising fluid effective to reduce roughness of the chalcogenide material outer surface from what it was prior to the exposing; and

after the exposing, depositing a second conductive electrode material over the chalcogenide material, and which is continuous and completely covering at least over the chalcogenide material, and forming the second conductive electrode material into an electrode of the device.

2. The method of claim 1 wherein the iodine comprising fluid is a liquid.

3. The method of claim 1 wherein the iodine comprising fluid is an iodide solution.

4. The method of claim 1 wherein the iodine comprising fluid is a potassium iodide solution.

5. The method of claim 4 wherein the potassium iodide solution comprises from 5 to 30 grams I_2 per 1 liter of a from 20% to 50% potassium iodide solution.

6. The method of claim 1 wherein the silver comprising layer is predominately elemental silver.

7. The method of claim 1 wherein the irradiating is effective to form Ag_2Se as at least part of the outer surface, the etching being effective to etch away at least some of the Ag_2Se and thereby at least partially contributing to said roughness reducing.

8. The method of claim 1 wherein "A" comprises Ge.

Sb A2

9. The method of claim 1 comprising forming the non-volatile resistance variable device into a programmable memory cell of memory circuitry.

10. The method of claim 1 wherein the first and second conductive electrode materials are different.

Sub A3

11. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising A_xSe_y, where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

after forming the chalcogenide comprising material, forming Ag_2Se over the chalcogenide comprising material;

after the irradiating, exposing the Ag_2Se to an iodine comprising fluid effective to etch away at least some of the Ag_2Se; and

after the exposing, depositing a second conductive electrode material over the chalcogenide material and forming the second conductive electrode material into an electrode of the device.

12. The method of claim 11 wherein "A" comprises Ge.

Sub A4

13. The method of claim 11 comprising forming the non-volatile resistance variable device into a programmable memory cell of memory circuitry.

14. The method of claim 11 wherein the iodine comprising fluid is a liquid.

15. The method of claim 11 wherein the iodine comprising fluid is an iodide solution.

16. The method of claim 11 wherein the iodine comprising fluid is a potassium iodide solution.

17. The method of claim 16 wherein the potassium iodide solution comprises from 5 to 30 grams I_2 per 1 liter of a from 20% to 50% potassium iodide solution.

18. The method of claim 11 comprising depositing the second conductive electrode material to be continuous and completely covering at least over the chalcogenide material.

19. The method of claim 11 wherein the exposing is effective to etch away substantially all of the Ag_2Se.

Sub A5

~~20. A method of forming a non-volatile resistance variable device, comprising:~~

~~forming a first conductive electrode material on a substrate;~~

~~forming a chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising A_xSe_y, where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;~~

~~after forming the chalcogenide comprising material, forming a discontinuous layer of Ag_2Se over the chalcogenide comprising material;~~

~~after the irradiating, exposing the Ag_2Se to an iodine comprising fluid effective to etch away at least some of the Ag_2Se; and~~

~~after the exposing, depositing a second conductive electrode material over the chalcogenide material, and which is continuous and completely covering at least over the chalcogenide material, and forming the second conductive electrode material into an electrode of the device.~~

21. The method of claim 20 wherein the iodine comprising fluid is a liquid.

22. The method of claim 20 wherein the iodine comprising fluid is an iodide solution.

23. The method of claim 20 wherein the iodine comprising fluid is a potassium iodide solution.

24. The method of claim 23 wherein the potassium iodide solution comprises from 5 to 30 grams I_2 per 1 liter of a from 20% to 50% potassium iodide solution.

25. The method of claim 20 wherein the exposing is effective to etch away substantially all of the Ag_2Se.

26. A method of forming a programmable memory cell of memory circuitry, comprising:

forming a first conductive electrode material on a substrate;

forming a substantially amorphous chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising A_xSe_y, where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

forming a silver comprising layer over the chalcogenide comprising material;

irradiating the silver effective to break a chalcogenide bond of the chalcogenide material at an interface of the silver comprising layer and chalcogenide material and diffuse at least some of the silver into the chalcogenide material, the irradiating being effective to form a discontinuous layer of Ag_2Se over the chalcogenide comprising material, the irradiating being effective to maintain the chalcogenide material underlying the Ag_2Se in a substantially amorphous state;

after the irradiating, exposing the Ag_2Se to an iodine comprising fluid effective to etch away at least a majority of the Ag_2Se; and

after the exposing, depositing a second conductive electrode material over the chalcogenide material, and which is continuous and completely covering at least over the chalcogenide material, and forming the second conductive electrode material into an electrode of the device.

27. The method of claim 26 wherein the iodine comprising fluid is a liquid.

28. The method of claim 26 wherein the iodine comprising fluid is an iodide solution.

29. The method of claim 26 wherein the iodine comprising fluid is a potassium iodide solution.

30. The method of claim 29 wherein the potassium iodide solution comprises from 5 to 30 grams I_2 per 1 liter of a from 20% to 50% potassium iodide solution.

31. The method of claim 26 wherein the silver comprising layer is predominately elemental silver.

32. The method of claim 26 wherein "A" comprises Ge.

33. The method of claim 26 wherein the exposing is effective to etch away substantially all of the Ag_2Se.

Add C'

add D5